

# N ewsletter



Global Center of Excellence (GCOE)  
Kyoto University-University of Malaya



Kyoto University Global COE Program  
Global Center for Education and Research on  
Human Security Engineering for Asian Megacities



Special Coordination Funds for Promotion Science and Technology  
Strategic Program for Fostering Environmental Leaders  
International Center for Human Resource Development in  
Environmental Management

Kyoto University  
Graduate School of Engineering

JSPS-Asian Core Program (IWM)

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The 1<sup>st</sup> JSPS-Asian Core Program (IWM) Comprehensive Symposium held in Katsura Campus, Kyoto University (Feb 28, 2012). 43 Malaysian and 47 Japanese participants attended the symposium.



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Prof. Masaki Takaoka (third from right) and his student (end left) visit GCOE KU-UM office at Institute of Graduate Studies, University of Malaya (Dec 8, 2011).

University of Malaya-Kyoto University program  
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UNIVERSITY  
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SUSTAINABILITY SCIENCE  
CLUSTER

## Development of a Hybrid Membrane System for Enhanced Removal of Endocrine Disruptor Chemicals (EDC) in Wastewater



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Technology is advancing very rapidly and industries are trying very hard not to be left behind. The demand for better healthcare products together with advances in new technology have resulted in industrial wastewater that may contain chemicals that are harmful to human health. Some of these chemicals of concern from the pharmaceutical manufacturing industries include endocrine disrupting chemicals (EDC) and pharmaceutically active compound (PhACs). Since majority of EDCs present in wastewater are low in molecular weight ( $<1000\text{Da}$ ), nanofiltration is suitable to remove EDCs compared to reverse osmosis and ultrafiltration. However, like other membrane processes, nanofiltration is unable to destroy or degrade the concentrated pollutants by itself. The disposal of those pollutants is still required. Chlorination is an excellent method to destroy EDCs but the formation of disinfection by-product may be dangerous to the environment. This system was proposed in order to study how both systems interact simultaneously.

In this research, EDC were subjected to simultaneous chlorination and nanofiltration. To understand how both mechanisms worked, EDC were subjected to free active chlorine (FAC) for the chlorination process and nanofiltration separately under different reaction conditions such as pH and operating pressure. Reaction intermediates and by-products formed during the process were identified using HPLC, LC-MS and also GC-MS. In the hybrid membrane system, a selected EDC was added to the feed reservoir and was subjected to nanofiltration. One ml of permeate was taken at fixed interval and samples were analyzed using HPLC. FAC was added to feed reservoir once the EDC concentration in the permeate reach 0.01mg/L. To maintain the concentration of EDC in the permeate, FAC was added to feed reservoir every time the EDC concentration in permeate exceeded 0.01mg/L. To maintain a constant working volume, constant rate of EDC was fed by using another pump into feed reservoir. The membrane performance was studied by monitoring the permeate flux and also by analysing the membrane morphology and its properties.

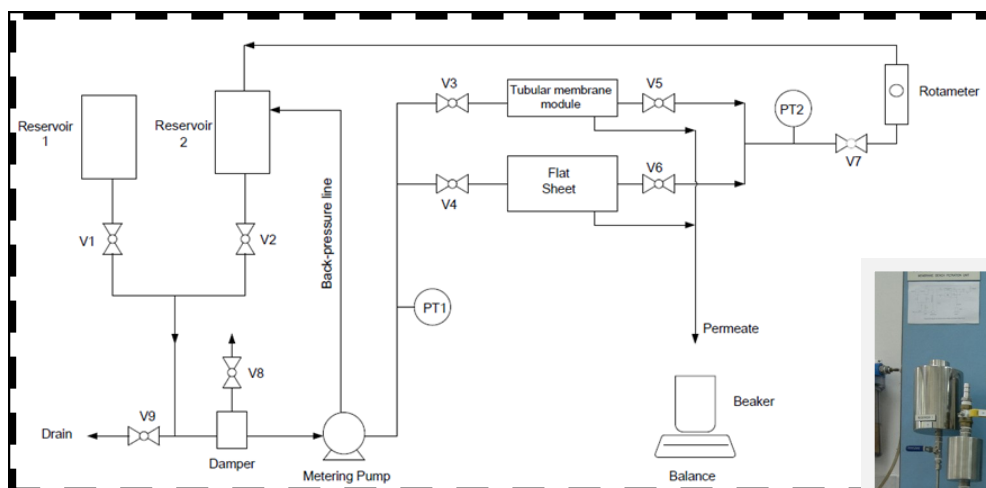


Fig. 1 Schematic layout of the Hybrid Membrane System experiment.





## Investigation of Evacuation Process at Malaysian Shoreline against the Tsunami Attack



**Muhammad Salleh bin Haji Abustan**  
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Department of Civil and Earth  
Resource Engineering,  
Graduate School of Engineering,  
Kyoto University



**Prof. Hitoshi Gotoh**  
Urban Coast Design Laboratory,  
Department of Civil and Earth  
Resource Engineering,  
Graduate School of Engineering,  
Kyoto University

**Research location:** Kuala Lumpur  
Perak and Pulau Pinang, Malaysia  
**Research term:** 2009-2011

### Message from supervisor:

Mr. Abustan has been engaged in a numerical simulation of crowd evacuation process by using the crowd behavior model based on the distinct element method. He investigates bottlenecks of evacuation against tsunami event by a microscopic simulation. The results of the simulation are expected to be useful for a rational evacuation planning

### Research-

#### Introduction and objective:

After the Asian Tsunami disasters in December 2004, the affected countries took the precaution to reduce number of deaths by improving infrastructure near a shoreline. Quick evacuation from a beach by providing an appropriate evacuation route and evacuation place is significant way to reduce the number of casualties. To enhance quick evacuation, exercises should be conducted to categorize the safety level of each area. Nevertheless, the real exercise is impossible to be done since it requires a traffic regulation with significant costs. Hence, the investigation of an evacuation process by using numerical simulator is regarded as efficient tool for measurement. In my research, the evacuation planning has been performed by using the DEM-base Crowd Behaviour Simulator for Disaster Evacuation (CBS-DE) proposed by Prof. Gotoh et al. to track individual evacuation behaviour in detail. The goal of my research is to propose a rational design of evacuation planning.

#### Result and discussion:

The first part of my research is an observation and measurement for collecting the basic information for simulating tsunami evacuation at Teluk Batik Beach in Malaysia. The information contains the land use and topography, bathymetry and population distribution. From the on-site survey, the land use and topography around Teluk Batik Beach were gathered; approximately 1500 of visitors per day during weekend were observed; the bathymetry around the shallow coastal zone and current were measured with the Acoustic Doppler Current Profiler. The second part is to obtain the walking speed of Malaysian citizen for implementation of the CBS-DE simulator. The video camera was located at Jalan Raja Laut in Kuala Lumpur and Jalan Penang in Penang. The walking velocity was analyzed from the videotapes shot at the pedestrian crosswalk. The evacuation planning by using CBS-DE simulator was conducted with the information mentioned above. Simulation results revealed the bottleneck area blocking a smooth evacuation. The importance of making an appropriate evacuation planning was shown clearly.

#### Conclusion and future plan:

The information and data, which are necessary for implementation of evacuation simulation using the CBS-DE simulator, was successfully collected through the on-site survey. After collecting basic information, virtual coastal small city was rendered with using the CG technique. Currently, numerical simulation for evacuation process is under study under some scenarios. The data of the bathymetry and current around shallow coastal zone will be utilized for simulating the evacuation behaviour in the sea in near future research. With the simulation results, proposing of a suitable evacuation planning is expected as a first step. In near future, existing behaviour model should be improved by considering the attraction effect to simulate group behaviour such as family, couple and friend. Simulation considering of the group effect will be performed.

#### Acknowledgement:

Part of this research was conducted during the internship program. The internship program gives good opportunity and excellent experience for me. Author gratefully thanks the financial support of GCOE-HSE, Kyoto University to the internship program for 1 month at the Universiti Sains Malaysia (USM) from August 2011 to September 2011. Besides, the author also acknowledges the Professor Hitoshi Gotoh, Associate Professor Eiji Harada, Professor Hamidi Abdul Aziz, Professor Ismail Abustan and the staff of School of Civil Engineering, USM. I am so grateful and thankful for all your help.



# International Center for Human Resource Development in Environmental Management

Environmental Management Leader Program

## Wildlife and natural mineral licks inside a production forest – a study in Anap Sustainable Development Unit in Central Sarawak, Malaysia



**Jason Hon Shung Sun**

Laboratory of Landscape Ecology  
and Planning, Graduate School of  
Global Environmental Studies,  
Kyoto University

**Research location:** Bintulu,  
Central Sarawak, Malaysia  
**Research term:** 2010-2012



**Prof. Shozo Shibata**

Graduate School of Global Environ-  
mental Studies / Department of For-  
est Science / Graduate School of Ag-  
riculture / Field Science Education  
and Research Centre, Kyoto Univer-  
sity

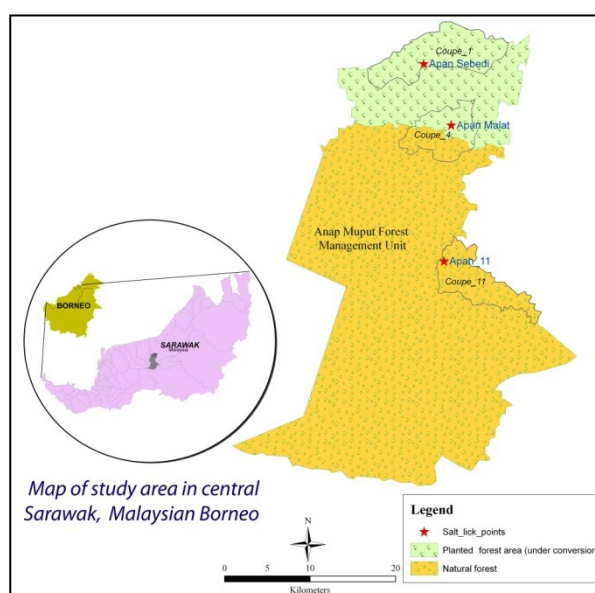
### Message from supervisor:

The study of Mr. Jason, Hon Shung Sun is very important and urgent to consider the co-existence of human beings and wildlife animals. In Malaysia Borneo the quality of natural forest is decreasing by forest cutting and mono-cultural plantation of *Acacia* species. His research results are important and helpful to understand the behavior of wildlife animals to the environmental change, and to build a conservation system in future.

### Research-

#### Introduction and objective:

Production forests are defined as forested areas designated for production and extraction of both wood and non-wood forest products. In Sarawak, a Malaysian state in Borneo with an area of 12 million hectares, 4.4 million hectares are classified as permanent forests, of which only 11% are gazetted as totally protected. In terms of wildlife conservation, the current extent of protected areas are small and/or sparsely distributed. Thus, production forests have become increasingly more important in helping our quest to conserve wildlife populations, by connecting these protected areas and by providing alternative habitat. Within these production forests, sustainable logging practices alongside good wildlife management measures are crucial towards maintaining sustainable populations of wildlife. Until we find a compromise to reduce logging activities and to increase totally protected areas, long term wildlife conservation in Sarawak lies with the roles production forests can play.



This research was carried out in Anap Sustainable Development Unit (ASDU), a multiple use landscape consisting of logging, human settlements, agriculture and plantations. Wildlife surveys and their use of important site such as naturally occurring salt licks were carried out. Camera traps were used to capture images and videos of wildlife. The objectives of the study were to determine the importance of salt licks for wildlife, and how forest management practices can help in preserving important sites for wildlife and to prevent these areas from being damaged by logging activities.



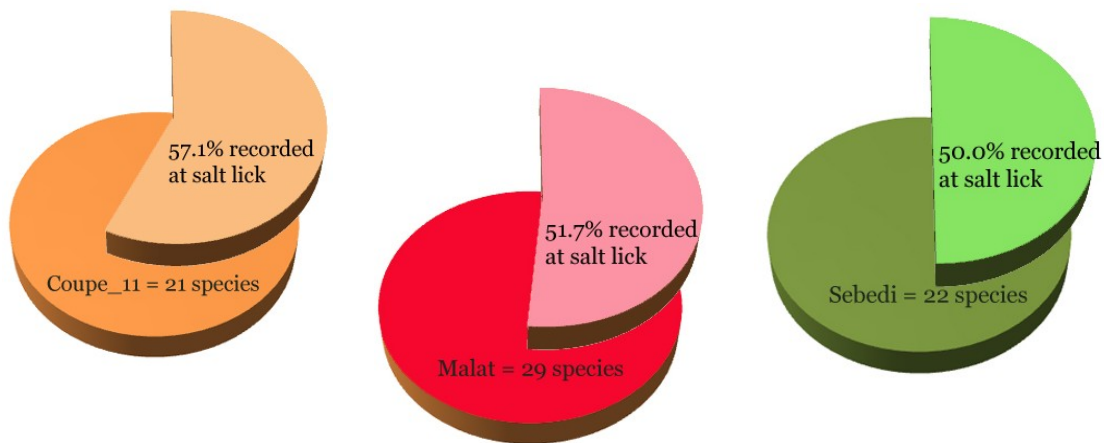


# International Center for Human Resource Development in Environmental Management

Environmental Management Leader Program

## Results and discussion:

In this study, over 30 species of large ground dwelling birds and terrestrial mammals were positively identified from camera trapping activities. The most common species recorded were muntjacs, sambar deer, bearded pig and pig-tailed macaque. Forests that have recovered more than seven years after logging recorded the highest number of species overall, as well as for carnivore species. Hunting activities were found to have an effect on animal behaviours. In sites nearer to human settlements and where hunting activities were recorded, the detection probabilities of commonly hunted species such as sambar deer dropped. This species also appeared to be more active over a short window of time after dark. In one site which is located furthest from human settlements with minimal hunting pressures, and despite being recently logged, animals were detected over a wider time frame during the 24-hour period, including coming out during the day time. The results above indicate that habitat features as well as anthropogenic factors are important considerations for the management of wildlife. Ungulates were encountered the most number of times visiting salt licks. Sambar deer have been observed drinking from salt licks. Analysis is being carried out to determine mineral contents and whether there are significant differences with non-salt lick sites nearby.



*Bornean yellow muntjac*



*A sambar deer*

Preliminary results have also indicated that the probability of occupancy by wildlife for salt lick sites were very high as compared to other sites with no salt licks. The implementation of reduced impact logging methods have helped maintain riverine vegetations and reduced volumes of timber removed to encourage sustainable regeneration. In a site that was logged seven years ago, globally endangered species such as the very rare Borneo baycat was recorded. This result indicated that well managed logged-over forest may support and provide alternative habitat for globally significant species and other wildlife as well. Other globally significant species recorded to date were pangolin, sunbear, binturong, banded palm civet, sunda clouded leopard, marbled cat and Bulwer's pheasant.

## Conclusion and future plan:

Long-term monitoring and commitments from stakeholders are crucial towards the conservation of wildlife. Conservation efforts must not be compromised by over-hunting activities or accessive damage, resulting in non-recovery of timber stocks and habitat conditions. Government enforced policies play equally important roles in ensuring that criteria for sustainable management of forests are met, and are compulsory for all production forests in operation. Nevertheless, for a system to be effective, information must be made available and decisions ought to be forthcoming. These are roles that the scientific communities can perform and affect influence on the government and related agencies. I envisage to continue working towards this cause.



# Asian Core Program

*Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management*



**Above:** The steering committee delegation from Japan together with Malaysian Steering Committee members after the 1<sup>st</sup> Steering Committee Meeting.

JANUARY  
18  
WEDNESDAY

The 1<sup>st</sup> Steering Committee Meeting was held in One World Hotel, Petaling Jaya Selangor, Malaysia (January 18, 2012). The agenda of the meeting discussed the present circumstances of fiscal year 2011 (April 2011 to March 2012) and procedure to visit Japan.

Visit Date	Deadline	Remarks
April – May		Practically impossible
June	The beginning of May	Should be avoided preferably
July – September	The end of May	-
October – December	The end of August	-
January – February	The end of November	Visit after the end of Feb. should strongly be avoided



**Left:** Meeting chaired by Prof. Dr. Hamzah Hj. Abdul Rahman, the Deputy Vice Chancellor (Research & Innovation) University of Malaya.



FEBRUARY  
28  
TUESDAY

**Above:** Participants of JSPS-ACP (IWM) gathered at the 1<sup>st</sup> Comprehensive Symposium.

The 1<sup>st</sup> Comprehensive Symposium was held in Jinyu Hall (Building C1-311) Katsura Campus, Kyoto University Japan (February 28, 2012). The symposium started with opening remarks by Prof. Komori Satoru (Dean of the Graduate School of Engineering, KU) followed by opening addresses by Prof. Yoshihisa Shimizu and Prof. Dr. Nik Meriam Nik Sulaiman. Objectives of the programs are:

- To create world-class research hubs in selected fields within the Asian region (the 1<sup>st</sup> international Asian core hub in Malaysia). The fields: watershed management and environmental risk assessment.
- To foster the next generation of leading researchers.
- To conduct exchanges based on a principle of equal partnership. These exchanges will take the form of joint research, seminars and other specific meetings and researcher exchanges.





## Asian Core Program

### *Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management*

#### The program benefits:

##### *Capacity building*

- ⇒ Exchange of bilateral expertise between Japan and Malaysia.
- ⇒ Expanding current base of young researchers involved in international network.

##### *Generation of knowledge in key areas of research*

- ⇒ Development of knowledge base on Malaysian Integrated Watershed Management (IWM).
- ⇒ Development of multidisciplinary approach on IWM which incorporates academic disciplines.
- ⇒ Dissemination of research output to society for implementation and future advancement through policy formulation and dialogues.

#### On the same day four research workshops were held concurrently:

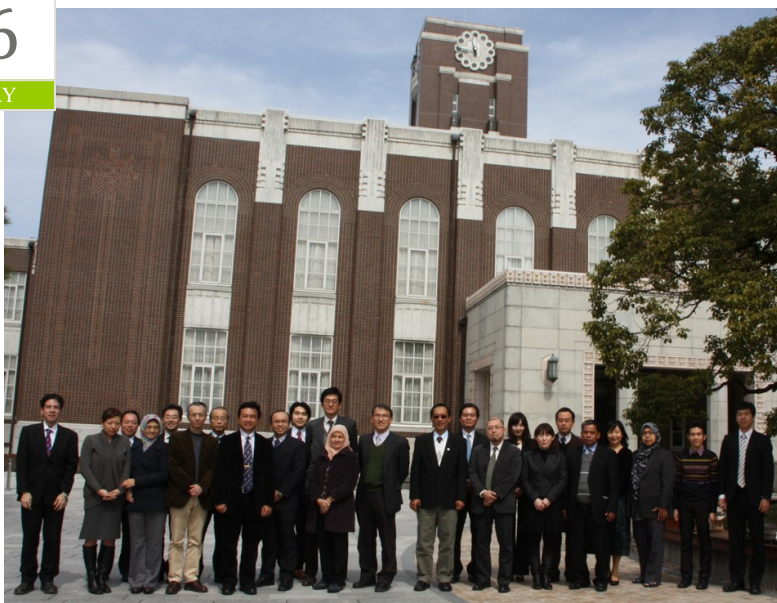
- Disaster prediction and hydrological evaluation in watershed caused by climate change (Hydrology Group).
- Quantitative prediction and evaluation of watershed environment with policy scenarios (Water Quality Group).
- Fate prediction of toxic chemicals in watershed and formulation of their screening methodologies (Environmental Risk Group).
- Knowledge data collection for integrated watershed management and analysis of governance structure (Governance Group).

The 2<sup>nd</sup> Steering Committee Meeting was held in Yoshida Campus, Kyoto University, Japan (March 16, 2012). The Malaysian steering committee delegates attended the meeting were: Prof. Dr. Nik Meriam Nik Sulaiman (UM), Prof. Dr. Mazlin Mokhtar (UKM), Prof. Dr. Zulkifli Yusop (UTM), Dr. Noor Zalina Mahmood (UM), Dr. Goh Choo Ta (UKM), Mr. Abdul Hamid Murad (MOHE), Ms. Nor Zaherah Yusof (UM) & Mr. Azizi Abu Bakar (UM). The Japanese steering committee members welcoming us during the meeting are: Prof. Yoshihisa Shimizu (KU), Prof. Minoru Yoneda (KU), Prof. Shinji Ide (Shiga Univ), Assoc. Prof. Tomonari Matsuda (KU), Dr. Keisuke Sato (Ritsumeikan Univ.), Dr. Kazunobu Kojima (KU), Dr. Sunmin Kim (KU), Dr. Ayako Fujieda (KU), Dr. Nobumitsu Sakai (KU), Mr. Koichi Masuchi (KU), Mr. Kyoichi Tamura (KU), Mr. Satoru Hikita (KU), Ms. Kimiko Toma (KU), Ms. Shoko Tabata (KU), Ms. Ikuko Moro (KU) & Mr. Daichi Uchibori (KU).

MARCH

16

FRIDAY

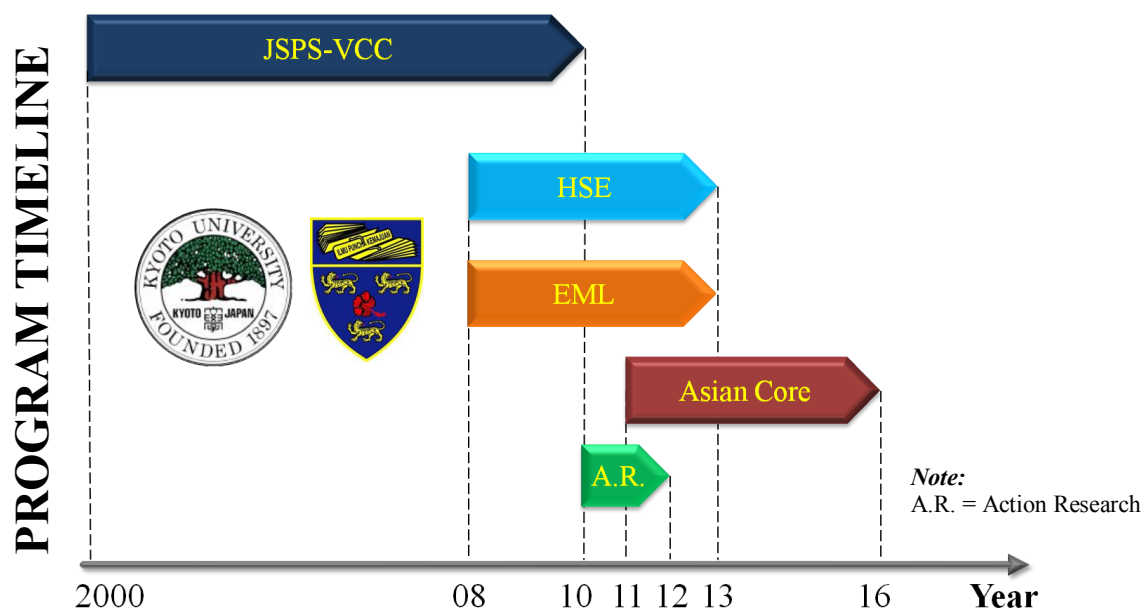


**Above:** JSPS-ACP (IWM) Steering Committee members, 24 of them meet up for deliberating the plans for succeeding the program till the year 2016.



**Left:** Members were entertained to an exclusive traditional Japanese “maiko” performance

The meeting discussed research activities planning in terms of paper/journal publications, educational activities (lectures/short courses and textbooks for the next generation), and selecting the suggested watershed nominated from the 1<sup>st</sup> Comprehensive Symposium. The procedure to visit Malaysia and planning for the next Comprehensive Symposium and Steering Committee Meeting was updated during this meeting.



Programs and its duration under international collaboration between Kyoto University and University of Malaya

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